

# 2014 Aquatic and Riparian Restoration Annual Report

USDA Forest Service  
Pacific Northwest Region



## USDA Forest Service Pacific Northwest Region 2014 Aquatic and Riparian Restoration Projects

The Pacific Northwest has world class and extremely valuable water and fisheries resources. Accordingly, aquatic and riparian restoration are priorities for the USDA Forest Service, Pacific Northwest Region. Restoration is being implemented in a prioritized and integrated fashion to restore watershed and stream structure and function at a whole watershed scale. Aquatic and riparian restoration benefits aquatic and terrestrial wildlife and fish populations, including federally listed and Sensitive species. It also improves recreation opportunities and provides reliable, clean water for downstream use. Our Forest and District Fisheries and Hydrology personnel are leaders in the design, planning, implementation, and monitoring of restoration projects. In addition, our Regional Restoration Assistance Team provides assistance on especially complex projects and helps field personnel maintain and improve their skills. This annual report features one of many restoration projects occurring on each Forest in the Region, providing a glimpse of the breadth and depth of this work and its outcomes. We thank our many internal and external partners that contributed to the success of these projects.

### **R**EGIONAL FISHERIES BIOLOGISTS AND HYDROLOGISTS

In the Pacific Northwest Region, we are well positioned for continued achievements in restoration. We look forward to working with you to achieve our mutual conservation goals.

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*Special thanks to Kimberly Conley, Lakeview Ranger District Fish Bio, Fremont-Winema NF, for compiling this annual report.*

For a complete directory of Forest and District Fisheries and Watershed personnel, please visit:

[http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5446396.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5446396.pdf)



# COLVILLE NATIONAL FOREST

## LeClerc Creek Aquatic Organism Passage and Partnership Projects

Partnering with the Kalispell Tribe of Indians, Washington State Recreation and Conservation office, and the Salmon Recovery Funding Board, the Colville National Forest replaced four fish passage barrier culverts on tributaries to the West and East Branches of LeClerc Creek. This project is a high priority among partners as it directly benefits native bull trout and Westslope cutthroat trout, and is located in priority subwatersheds and designated critical habitat for ESA-listed bull trout.

The project re-established passage to 2.5 miles of habitat upstream of the road crossings and reduced fine sediment delivery to four streams. Culverts were replaced with structures that facilitate aquatic organism passage by simulating a natural stream channel through the crossing.

The aquatics program on the Colville National Forest also put youth to work, utilizing three different programs to give youth an introduction into natural resource management and the federal workforce. The Forest partnered with the Northwest Youth Corp (NWYC) to accomplish labor-intensive fence building, while providing young men and women with job skills and training.



The NWYC completed an exclosure in the Swan Lake area, improved trails to reduce erosion, and installed fencing around four lakes to keep livestock out of recreation areas. Disadvantaged youth participated in a Work-source program to revegetate sites and block unauthorized roads. The Forest also provides seasonal job opportunities to college students studying in the field of natural resources.

For more information on this project and other restoration projects on the Colville National Forest, contact Brian Peck, Forest Biologist and Hydropower coordinator at 509-447-7373.



Pre-project undersized culvert



Post-project stream-simulation crossing

# COLUMBIA RIVER GORGE NATIONAL SCENIC AREA

## Sandy River Delta Dam Removal Project



Dam construction 1930s

In 1938, construction was completed on a dam that completely blocked flow on the mainstem Sandy River, just east of Troutdale, Oregon. All stream flow was diverted to a secondary channel to the west, called the Little Sandy River. The dam was approximately 750 feet long, 45 feet wide, 8 feet high, and was composed of sheet piles reinforced with large basalt stones. The intended purpose was to concentrate river flows into one channel affording passage for migratory fish during all seasons, with a primary focus on obtaining consistent returns of smelt.

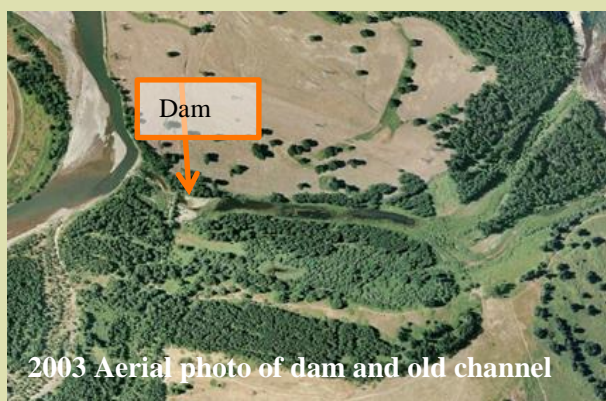
Prior to dam construction, the mainstem Sandy River was an extensive braided shallow-water habitat with an abundance of backwater that provided excellent habitat conditions for rearing juvenile salmon and steelhead. Since construction of the dam, the old mainstem Sandy River channel has silted in, becoming a backwater slough for the Columbia River and losing much of its hydrologic complexity. Salmonid habitat has been adversely impacted by impeded access and limited cool water flow, resulting in summer-time ponding and increased juvenile stranding and mortality.

In the Fall of 2013, the Sandy River Delta Dam was

finally removed and the mainstem Sandy River was able to flow unimpeded after 75 years. Off-channel habitat for juvenile salmonids has been improved by restoring the hydrology and physical channel processes in the delta. Water can now enter this portion of the river, even under low flow conditions, eliminating ponding and stranding of fish and other aquatic life. The dam removal also improves water temperatures and dissolved oxygen. Restoration will yield environmental benefits to spring and fall Chinook salmon, coho salmon, winter steelhead, cutthroat trout, rainbow trout, eulachon (smelt), Pacific lamprey, mountain whitefish, and threespine stickleback.

Dam removal marked the culmination of a fifteen year effort that involved many partners, including the Army Corps of Engineers, Bonneville Power Administration, Oregon Division of State Lands, Portland Water Bureau, Oregon Department of Fish and Wildlife, the Sandy River Basin Watershed Council, and Williams Northwest Pipeline Company.

For more information, please contact Mark Kreiter, Scenic Area Hydrologist at 541-308-1744 or Brett Carré, Scenic Area Biologist at 541-308-1718.



2003 Aerial photo of dam and old channel



2014 Aerial photo of removed dam and restored channel



# **D**ESCHUTES NATIONAL FOREST

## **Whychus Creek Dam Removal and Floodplain Restoration Project**

Whychus Creek is a flashy, cobble bed stream that originates at the foot of the Three Sisters Mountains. Historically, the stream was a flood hazard as high flows and woody debris caused the stream to flood into the town of Sisters. Following the 1964 flood, the stream was channelized, making conditions worse and causing it to down cut and abandon side channels that previously helped to dissipate floods.

The stream also had all its flow diverted for irrigation and was dry in the town of Sisters during the summer. Through efforts of the Upper Deschutes Watershed Council (UDWC) and Deschutes River Conservancy (DRC) to conserve water and return flow to Whychus Creek, a flow of 20-30 cfs has returned downstream of the diversions.



Irrigation dam on Whychus Creek removed in 2014.

In 2010, fish passage was restored at Pelton Round Butte dams, opening access for steelhead and Chinook salmon to the middle Deschutes River and Whychus Creek. In 2014, the Forest Service and Upper Deschutes Watershed Council removed an irrigation dam on the Forest that blocked access to 13 miles of steelhead habitat on Whychus Creek, returning 1 cfs to the stream. The project removed berms and opened 2 miles of historic side channels in the floodplain, important habitat for juvenile steelhead trout and redband trout during high flows.



Project after first high flow event in October 2014.

To restore the habitat in these historic channels, adjacent forests were thinned and over 600 trees were placed instream and on floodplains for pool creation and roughness. A total of 170 acres of floodplain habitat was improved through the project. The design of the project works with the natural depositional process inherent to the landform, an alluvial glacial outwash fan. Through the capture of gravels in the multiple side channels, the project will increase salmonid spawning and rearing habitat. Floodplain deposition of fine sediments from the recent Pole Creek Burn Area is already occurring. These deposits will aid the establishment of the willow and cottonwood dominated riparian vegetation. Riparian planting is planned for the future.

This project was made possible through a partnership with the UDWC, DRC, and the Sokol family. Funding was provided by the Forest Service through the Deschutes Skyline Collaborative Forest Landscape Restoration Project, Oregon Watershed Enhancement Board, Pelton Round Butte General Fund, National Fish and Wildlife Foundation, National Forest Foundation, The Nature Conservancy, The Reser Family Foundation, and Patagonia.

For more information about this project, please contact: Michael Riehle, District Fisheries Biologist, Sisters Ranger District, 541-549-7702.

# **F**REMONT-WINEMA NATIONAL FOREST

## **North Fork Sprague Ditch Diversion and Restoration Project**

In 2011, the Bly Ranger District of the Fremont-Winema National Forest began discussions with U.S. Fish and Wildlife Service (USFWS) to replace an existing diversion headgate and install a new fish screen on the North Fork Ditch Diversion in the North Fork Sprague River. The North Fork Ditch project was one of several potential projects identified in the Upper Sprague Core Area of the Klamath Basin, targeting habitat restoration for Threatened bull trout populations of Gearhart Mountain. The project was implemented in 2014 in collaboration with the Klamath Basin Rangeland Trust (the primary non-governmental partner in this project), eleven private landowners, the Oregon Department of Fish and Wildlife, and USFWS. The unscreened North Fork Ditch has been in continuous use for over 100 years.

The North Fork Sprague River is designated as Klamath Basin Bull Trout Critical Habitat. In addition, resident and migratory redband trout and

the undescribed Klamath Lake lamprey are also present in the river at this location. The existing water right of 60 cfs at the diversion is a significant proportion of the river volume at all times, and even greater during low flow periods, increasing the probability of entrainment of significant numbers of out-migrating bull trout, redband trout, or lamprey. This project will reduce loss and mortality of juvenile bull trout and other juvenile fish, by preventing their entrainment into irrigation systems. The project will also improve access to upstream habitats by creating a low flow migration channel and will provide more accurate metering of irrigation diversion flows from the North Fork Sprague River.

For more information, please contact:  
Kimberly Conley, District Fish Biologist, Bly and Lakeview Ranger Districts, 541-947-6330



Pre-project diversion site.



Newly built diversion screen to exclude fish from the irrigation ditch.



# **G**IFFORD PINCHOT NATIONAL FOREST

## **Layout Creek Aquatic Organism Passage Project**

In 2014, the Gifford Pinchot removed the last major aquatic organism passage barrier in the Trout Creek (priority) subwatershed. An undersized arch pipe on Layout Creek was replaced with a bridge structure, simulating natural stream conditions through the crossing reach.

The project removed an existing 12' x 8' x 59' structural plate pipe arch and installed a 16' x 45' concrete bridge. The new bridge consists of concrete, pre-stressed voided slabs bearing on geosynthetic-reinforced soil abutments. Abutment design and construction employed a Geosynthetic-Reinforced Soil—Integrated Bridge System (GRS-IBS) technology that is currently being promoted by Federal Highways Administration and is intended to be relatively inexpensive and rapidly constructed. The stream reach through the crossing was reconstructed to simulate the morphology and function of the stream upstream and downstream of the site.

### **Expected Benefits:**

- Restored upstream access for all life stages of native rainbow trout and steelhead in upper Layout Creek
- Restored channel connectivity and improved instream habitat for other aquatic organisms
- Improved channel function and crossing performance during high and low flows
- Reduced risk of crossing obstruction and failure during subsequent floods

Project partners include Ecotrust, Mid-Columbia Fish Enhancement Group, Bonneville Power Administration, and Federal Highway Administration, with a total project cost of \$279,000. The project restored access to 1 mile of quality habitat, benefitting the federally listed Lower Columbia River steelhead.

For more information, please contact:

Ruth Tracy, Soil and Water Program Manager,  
Gifford Pinchot National Forest, 360-891-5112



Pre-project view looking downstream through crossing. See wood on right and left stream banks for reference points



Post-project view looking downstream through crossing. See wood on right and left stream banks for reference points

# MALHEUR NATIONAL FOREST

## Camp Creek Watershed Large Woody Debris Project

Completed in 2014, the Camp Creek Watershed Large Wood Project is a multi-year project to restore water quality and habitat for ESA listed fish species. In addition to the placement of large wood in the stream, the project removed 22 legacy log weirs that were artificially widening and slowing the stream channel. The work was identified in the Camp Creek Watershed Restoration Action Plan.

The Camp Creek watershed is occupied by federally listed Mid-Columbia steelhead and juvenile Chinook salmon and contains designated Critical Habitat and Essential Fish Habitat for both species. Because of this, the watershed is a high priority for habitat protection and restoration in the Middle Fork John Day River subbasin.



Upper Camp Creek pre-project.



Upper Camp Creek after the addition of large wood

Benefits of the project include instream channel complexity, increased pool frequency, protection and establishment of riparian hardwoods within the floodplain, stream channel narrowing and meandering, removal of juvenile fish passage barriers, activation of side channels, establishment of floodplain connectivity where the channel is incised, and increased aggradation and gravel deposition within appropriate locations.

Phase I began in 2013 and involved four miles of stream within West Fork Lick Creek, East Fork Camp Creek, and Upper Camp Creek. There were 686 trees directionally felled into the streams to facilitate deposition/aggradation, scour pools, activate side channels, and induce meandering.

Phase II began in 2014 and involved two miles of Camp and Cougar creeks where 400 trees were tipped and placed with heavy equipment. An additional 80 trees from an off-site source were hauled in and placed. In Phase II, the Forest used heavy equipment to correct 22 legacy log weirs within a one mile section of Camp Creek. Approximately 120 entire trees were tipped and placed at weir removal locations. An additional 40 trees were hauled in from an off-site source and placed instream. An additional 240 trees were felled in the remaining two miles of stream and 2,500 willow stakes were planted, with an additional 5,000 stakes planned for planting in 2015.

Project partners included the Long Creek and Dixie allotment permittees, Grant County Stockgrowers Association, Blue Mountains Biodiversity project, and Grant County Conservationists.

For more information, please contact Steve Namitz, Forest Fisheries Program Manager, Malheur National Forest, 541-575-3167.





Pre-project Camp Creek, June 2011. Legacy log weir structures were artificially widening and slowing the stream.



Post-project Camp Creek, June 2014. The legacy log weir structures were removed and large wood added, significantly narrowing and deepening the stream.

# **M** **T. BAKER-SNOQUALMIE NATIONAL FOREST**

## **Greenwater River Floodplain Restoration Project**

In 2014, the final phase of the Greenwater Floodplain Restoration Project was completed in the White River Watershed on the Snoqualmie Ranger District. The Greenwater River provides habitat for federally listed Puget Sound Chinook salmon, steelhead, and bull trout and is historically one of the principal spawning areas for spring Chinook salmon. Due to a history of logging, stream cleanout, and road development, the river become entrenched and lacked large wood that is an important component of habitat conditions. The project was developed through public and Tribal involvement and funding was awarded to the South Puget Sound Salmon Enhancement Group (SPSSEG) through a grant from the State Salmon Recovery Funding Board.

The SPSSEG contracted consulting firms that had expertise in large log jam projects, including a firm who had a technical specialist that pioneered engineered log jams. The final project design incorporated hydraulic and geomorphic assessments, site surveys, input from Tribal biologists and natural resource managers from the Muckleshoot Indian and Puyallup Tribes, along with the Forest Service. The log jams are composed of multiple layers of varying lengths of logs (both with and without rootwads) and were designed to withstand 100-year peak flow events, with a 50-year design life span.

Log piles were buried into the substrate below scour depth with several layers of redundancy included to allow for changes without jeopardizing stability. Some of the logs with intact root wads, used as buttressing for the vertical root wad piles, were placed at low flow elevation to provide fish cover. The riverside road was fully obliterated, the side channel excavated, and the disturbed riparian area adjacent to the project was replanted with native conifer species.

The project removed nearly a mile of abandoned riparian forest road fill and rip-rap and added 17 large log jams to the river at strategic locations to

slow flood flows, accumulate and sort gravels, and deflect flows into relic floodplain channels. Nearly 70,000 cubic yards of road fill and large rip-rap rock were removed from the Greenwater floodplain while adding over 2,700 pieces of wood to the project reach.

The Greenwater River Floodplain Restoration project provides both immediate and long-term benefits, including the addition of habitat complexity and resiliency. The addition of wood provides habitat complexity, dissipates river energy, and collects spawning gravel. The engineered log jams provide anchor points for additional downstream-floating wood to collect over the long term, continuing to add to the size and complexity of the structures. Restoring side channels and floodplains dissipates high flow energy and provides refuge habitat for salmonids.



Completed road obliteration and side channel work on the Greenwater River.



The SPSSEG played a key role in the implementation of the project. Kristen Williamson, SPSSEG project manager, was recognized by the Puget Sound Partnership as a “Puget Sound Champion” for her role in successfully implementing this project. Total funding for this project was over \$2.2 million and was provided by Puget Sound Acquisition and Restoration grant, Natural Resource Damage and Restoration, Washington State Department of Transportation, Puyallup Tribe of Indians, Service First grant (includes funding from Bureau of Land

Management, USDA Forest Service, US National Park Service, and US Fish and Wildlife Service), King County Cooperative Watershed Management Grant, and the South Mt. Baker Snoqualmie Resource Advisory Committee Grant.

**Project Contacts:**

Karen Chang, South Zone Fishery Biologist, Mt. Baker Snoqualmie NF, (425) 888-8758  
Loren Everest, Forest Fisheries Program Manager, Mt. Baker Snoqualmie NF, (425) 783-6040



An engineered log jam under construction.



A completed engineered log jam.

# **M** **T. HOOD NATIONAL FOREST**

## **Lake Branch Restoration Project**

This September, a cooperative restoration effort between the Confederated Tribes of Warm Springs and the Mt. Hood National Forest, Hood River Ranger District resulted in successful treatment of nearly two miles of ESA-listed summer steelhead habitat on the Mt. Hood National Forest, located in Lake Branch, a tributary to the West Fork Hood River. Restoration in the West Fork Hood River watershed is high priority within the Hood River Basin and this project is intended to aid in restoring aquatic habitat for the recovery of ESA listed summer steelhead in the Hood River Basin.

The goal of this project was to restore critical ecosystem processes in this reach by increasing stream habitat complexity and floodplain connectivity to help maintain channel stability and absorb stream flow energy during high flow events. To achieve this, our objectives were to increase the amount of floodplain large wood to 30 pieces per acre, increase in-channel large wood to 150-200 pieces per mile, and to collect, sort, and store suitable sized spawning gravel (30-40 mm) for steelhead and resident trout species.

Over a two day period, 603 logs were placed by helicopter in 1.7 miles of stream and associated floodplain; 261 logs were placed in 19 structures within the stream; and 342 logs were placed within the floodplain or incorporated into logjams extending out into the stream channel. The project increased the pieces of large wood per mile by 248%. A total of 17 hours of helicopter airtime was used to implement this project. Total cost of the restoration project was \$240,000.

Project partners include the Confederated Tribe of Warm Springs, Bonneville Power Administration, Secure Rural Schools and Community Self-Determination Act of 2000 (Title II) Funding, and Hood River Watershed Group (collaborated on planning and implementation).



A helicopter lowers large wood into Lake Branch.

For more information, please contact Chris Rossel, District Fish Biologist, Barlow Ranger District, 541-467-5119.



Log jam placed into the West Fork Hood River



# **OCHOCO NATIONAL FOREST**

## **Jackson Creek and Trout Creek Restoration Projects**

The Jackson and Trout Creek Restoration Projects were designed to restore stream and floodplain function, water quality and quantity, and native riparian plant communities within the subwatersheds. These projects will incrementally reduce stream temperatures and increase water storage capacity, reduce entrenchment of streams, and protect and restore critical groundwater dependent ecosystems. Both Jackson and Trout creek projects will enhance and restore habitat for redband trout and Columbia spotted frog, and increase native riparian plant communities. Additionally, Trout Creek provides spawning, rearing, and holding habitat for Endangered Species Act listed Middle Columbia River (MCR) steelhead trout, designated Critical Habitat for MCR steelhead trout, and listed Essential Fish Habitat (EFH) for salmon.

In Jackson Creek, project activities included the restoration of approximately one-half mile of stream by reconnecting the stream with historic floodplain. Whole trees, native rock, and fill were strategically placed within the channel in variable sized debris jams and log complexes. Approximately 200 trees were placed between larger structures to function as short- and mid-term aquatic species habitat.



Placement of large wood in Jackson Creek.

The riparian area was planted and fenced along the stream and adjacent meadow to protect resources. The total cost of implementation was approximately \$30,000.

In Trout Creek, project activities included placement of large woody debris complexes to increase the number of pools per mile and to mimic naturally formed structures in the stream channel (approximately 23 large wood complexes were installed). Berms and road fill were removed in key locations along the 0.5 miles reach to increased floodplain access in areas where channel incision had occurred. Removing the berms allowed several side channels to be reconnected to Trout Creek and previously installed log sills and cross-vanes were removed or rehabilitated to more naturally mimic instream structures. Floodplains will be revegetated with seeds and plants of native grass, forb, and shrub species in 2015.



Berm removal along Trout Creek. The legacy berm disconnected the stream from its floodplain.

For more information about Jackson Creek, please contact Mark Lehner, District Fisheries Biologist, Bend/Fort Rock Ranger District, 541-416-6480. For more information about Trout Creek, please contact Jennifer Mickelson, District Fisheries Biologist, Lookout Mountain Ranger District, 541-416-6485.

# **O** **KANOCHAN-WENATCHEE NATIONAL FOREST**

## **Upper Peshastin Road Decommissioning Project**

The Upper Peshastin Watershed Restoration Action Plan identified road density impacts and location, and the lack of road maintenance, as the primary threats to aquatic habitat in the subwatershed. Peshastin Creek supports federally listed spring Chinook salmon, steelhead, and bull trout, as well as redband and cutthroat trout.



An undersized culvert at Tronsen Creek prior to (above) and after (below) project implementation.



In 2012, the Wenatchee Ranger District completed an environmental analysis to decommission 20 miles of road in the Peshastin watershed. Beginning in 2013, the Peshastin Road Decommissioning Project has been funded through the Legacy Roads and Trails program to improve watershed condition by decommissioning priority roads and removing barriers to fish and flows. Two road decommissioning contracts for the removal of 15 miles of road were implemented in 2014.

Aquatic and engineering staff surveyed road segments and prescribed decommissioning treatments according to the physical condition of each road segment, its location, and site specific resource objectives. Treatments included full and partial recontour, road surface decompaction, outloping, water bars, mulching, and seeding. Twelve undersized stream crossing culverts were removed and four miles of valley bottom roads were decommissioned. We also surveyed and designed treatments for road crossings at Tronsen Creek, where two undersized culverts were removed. Removing the undersized culvert barriers on Tronsen Creek increases habitat available for federally listed steelhead juveniles and resident rainbow trout. The total project cost was \$240,000.

For more information, please contact:  
Richard Vacirca, Forest Fisheries Program  
Manager, Okanogan-Wenatchee NF, 509-664-9361



# **O**LYMPIC NATIONAL FOREST

## **30 Road Aquatic Organism Passage Retrofits**

The Olympic National Forest implemented an experimental project to improve fish passage through two existing culverts on tributaries of Bear Creek in the upper Sol Duc River watershed. The culverts, which are 10 feet and 8 feet in diameter, were installed in 2010 as part of an ARRA road reconstruction project. Collectively, they provide access to about 0.5 miles of headwater habitat for coho salmon and steelhead. Both culverts were designed to achieve fish passage with modified stream simulation designs. Due to steep stream gradients, a series of sediment retention sills were welded into each culvert to stabilize and maintain the streambed materials placed within the pipe. The steep gradients through the culverts also required larger gravel and cobble substrate than was typically found upstream or downstream.

Construction challenges limited the effectiveness of the new culverts to achieve consistent fish passage.

High water during winter storms carried away most of the stream gravels that were initially placed in the culverts in 2010. Instead of stabilizing the

streambed gravels inside the culverts, the welded sills formed small steps and barriers to migrating juvenile fish. Without gravel in the culverts to create roughness and hiding areas, water velocities were too great for successful fish passage conditions.

In September, 2014 the Olympic National Forest hired a contractor to bring in approximately 60 cubic yards of gravel, cobble, and small boulders and recreate a streambed inside the 100 feet long culverts. The streambed materials were substantially larger than during the initial construction, with large cobble and numerous boulders up to 2 feet in diameter to provide stability and roughness to the streambed.

The resulting improvements have created stable roughened channels that appear to provide excellent passage conditions through the two culverts.

For more information, please contact Bob Metzger, Aquatic Program Manager, Olympic National Forest, 360-956-2293.



Workers place boulders and cobble in the culvert.

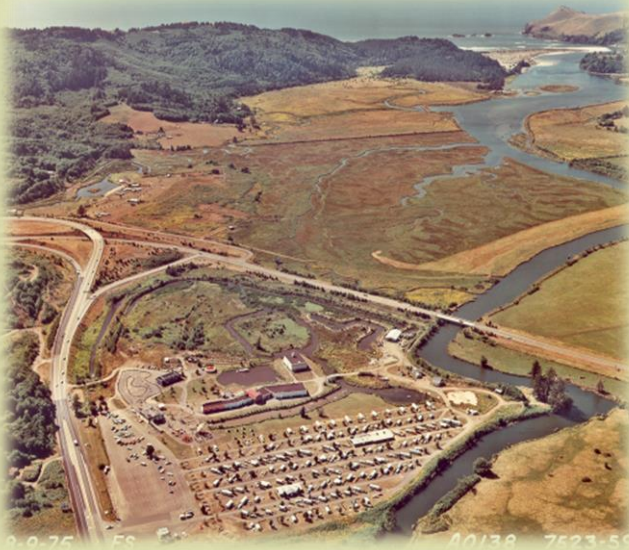


The boulders and cobbles created a streambed in the previously impassable culvert.

# SIUSLAW NATIONAL FOREST

## Boat Basin Restoration in the Salmon River Estuary Project

The Salmon River estuary is one of the few remaining relatively undeveloped estuaries on the Oregon Coast, despite its long history of human use. Between 1954 and 1974, most of the estuary had been diked and ditched to create pastures. By the early 1960's, 75% of the lower Salmon River marsh habitat was isolated by dikes and tidegates and development on the marsh floor had occurred (Figure 1). This included a housing development and an amusement park.



1975 aerial photo of development in the Salmon River Estuary

The Cascade Head Scenic-Research Area Act, passed by Congress in 1974, recognized the ecological value of this landscape. It mandated no further impacts and tasked the Siuslaw National Forest as the management agency in charge of protecting and restoring this area. In 1978, land acquisition and restoration began and over the last 34 years, the Siuslaw National Forest has removed dikes and tidegates and dismantled various developments, including an amusement park that was built on a tidal marsh. The Boat Basin Restoration project is the final small restoration

project to be completed in the Salmon River Estuary.



2014 Estuary restoration plans.

In the late 1950's, an L-shaped ditch was carved into the marsh floor, intended to be a boat mooring basin associated with a large proposed housing development nearby. The 60-foot wide ditch and the berm created during the excavation of the ditch altered the hydrology of nearby streams by diverting or cutting off stream flow. Planning for the Boat Basin restoration project relied on historic aerial photos, bare-earth high-resolution topographic data and imagery, and a topographic site survey. The project removed the berm, partially filled the ditch, and created a new channel for nearby Mink Creek.

For more information about this project, please contact:

Kami Ellingson  
Watershed Program Manager,  
541-750-7101



Pre-project 2005 Aerial photo of the Boat Basin area.



Mink Creek channel construction, August 2014.  
Excavator in center image is reestablishing the  
natural stream channel. Native revegetation will  
follow excavation.





# **R**OGUE RIVER-SISKIYOU NATIONAL FOREST

## **China Flat Instream Restoration Project**

The China Flat Instream Restoration Project is designed to improve degraded instream habitat within the South Fork Coquille River, a Whole Watershed Restoration Initiative Focus Watershed. The project area lacks instream complexity which reduces bank stability, cover, sinuosity, pools, and gravel recruitment necessary to recover ESA-listed coho salmon. The project will benefit multiple life stages of Oregon Coast ESU coho, spring and fall Chinook, Oregon Coast DPS steelhead, resident cutthroat trout, and Pacific lamprey.

The Forest Service worked with Plum Creek Timber (the landowner), Oregon Department of Fish and Wildlife, and the Coquille Watershed Association to place approximately 25 trees at 5 sites along 0.35 miles of side channel habitat. Standing trees averaging 65 feet in length were excavated and tipped, retaining their rootwads. The intent was for these trees to replicate a natural windthrow event with full length blow-down trees still attached to the rootwads.

The featured approach for habitat restoration in this project was to mimic natural processes and structure that could result from a wind storm or landslide. The project included the placement of five logjams along the China Flat reach of the river to restore habitat complexity. In addition to the wood placement, local Forestry and Biology high school students planted riparian vegetation in the project area.

Instream structures will benefit China Flat's aquatic resident species and continue to collect woody debris moving down the river, further improving instream habitat quality. The additional amount of large wood instream is expected to increase the number, depth, and complexity of pools for salmon and steelhead populations.

For more information, please contact:  
Karla Cottom, District Fish Biologist, Powers  
Ranger District, 541-439-6250



Placement of large wood in the China Flat reach of the South Fork Coquille River.



Completed large wood complex in the South Fork Coquille River



# **UMATILLA NATIONAL FOREST**

## ***Tucannon River Cooperative LWD Restoration***

The Upper Tucannon River watershed is a high priority for restoration to improve habitat for Chinook and steelhead in the Columbia Basin. This fish habitat restoration project utilized over 1000 wind-thrown trees from a nearby salvage project, from areas that were affected by wildfire in 2005 and 2006. The salvaged trees were placed in stream channels and riparian zones to create more pools and structure for anadromous fish habitat. The Tucannon River Cooperative LWD Restoration Project was sponsored by multiple agencies, including the Bonneville Power Administration, Washington Department of Fish and Wildlife Service, and coordinated by the lead agency, Confederated Tribe of the Umatilla Indian Reservation.



Large wood structure placed in the upper Tucannon River

and steelhead rearing; and one newly created high flow channel. The project was implemented using a combination of helicopter-placed trees and excavator-placed trees and boulders.

For more information about this project, please contact:  
Del Groat, District Fish Biologist, Pomeroy Ranger District, 509-843-4639.



Biologists directing the placement of large wood into the Tucannon River.

The project covers three specific treatment areas that were identified in the Tucannon Restoration Plan (2011) as a high priority for increasing floodplain connectivity and channel complexity. Once completed, construction on the project included: 94 engineered log jams to improve hydraulic complexity, increase channel stability, and increase floodplain connectivity; 67 logs or large woody debris for additional fish cover; four newly created side channels designed for Chinook



Large wood placed in a reach of the Tucannon River with limited existing wood.

# UMPQUA NATIONAL FOREST

## Narrows Restoration Project

The Umpqua National Forest, in partnership with the South Umpqua Rural Community Partnership, Partnership for the Umpqua Rivers, and the Oregon Watershed Enhancement Board, restored the “Narrows” section of the South Umpqua River to improve wild spring Chinook spawning habitat. The South Umpqua River is the longest free flowing river draining into the Pacific Ocean in Region 6. The project is located about 17 miles northeast of Tiller, Oregon. The current average adult spring Chinook run size in the river is two hundred fish.

Historic stream cleanout of large wood has resulted in channel substrate composition dominated by bedrock (> 50%) and lacking in suitable spawning substrate. Analysis of twenty-two years of smolt trap, adult counts, and stream gage data reveal a high correlation between elevated peak flows and low smolt production. This indicates that redd scour and juvenile swimming fatigue are limiting factors for spring Chinook. Areas for treatment were prioritized based upon the cumulative use for each of twenty-six holding pools, using the last fifty years of adult counts, and radio telemetry data

indicating spawning occurs within ½ mile of these holding pools.

The goal of the project was to provide approximately 8,000 ft<sup>2</sup> of stable spawning substrate during higher peak flow events. The project was accomplished using a dump truck, skidsteer, rock chute constructed from a culvert, and two excavators. One of the excavators was equipped with a jack hammer. Footer trenches for rock weirs were chiseled from the bedrock to provide stability. The weirs were then constructed and backfilled with approximately 300 yd<sup>3</sup> of a gravel and cobble mix sized to meet calculated shear stress requirements. Both spring Chinook and Oregon Coast coho salmon were observed using the treated area in the fall and winter of 2014.

For more information on this project, contact Casey Baldwin, Fisheries Biologist at Tiller Ranger District, at 541-825-3133. For more information on other restoration projects and opportunities on the Umpqua National Forest, contact Jason Wilcox, Forest Fisheries Biologist, at (541) 957-3360.



Excavator with jackhammer fitting chiseling away at the bedrock substrate of the project area to create trenches for footer rocks. Note the dominance of bedrock in this river reach.



Placement of footer rocks in chiseled footer channel.



# **WALLOWA-WHITMAN NATIONAL FOREST**

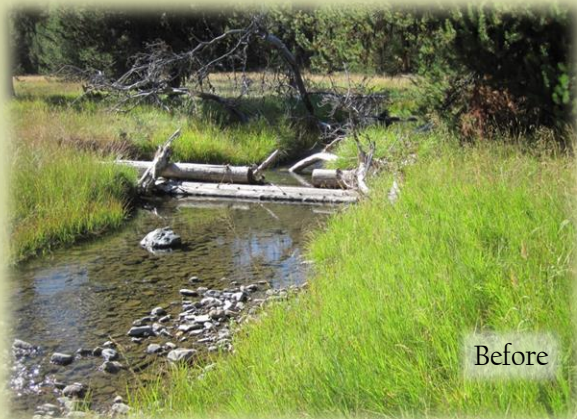
## **Sheep Creek Large Wood and Riparian Planting Project**

The Sheep Creek Large Wood and Riparian Planting Restoration Project is located on Sheep Creek, a tributary to the Grande Ronde River. The project is located within the Upper Grande Ronde River Watershed (1706010401) and Sheep Creek Subwatershed Sheep Creek (170601040105). Sheep Creek is spawning and rearing habitat for Snake River Basin summer steelhead, Snake River Basin spring Chinook salmon, and redband trout. The summer steelhead and spring/summer Chinook are federally listed under ESA as threatened species.



Placement of large wood in Sheep Creek.

Historic timber harvest and road building and maintenance removed larger conifers from the valley bottom, reducing the future recruitment of large wood to the stream. Historic grazing also caused impacts to the riparian area. In the late



1980's, the Wallowa-Whitman cooperated with Bonneville Power Administration to place sill log structures and exclude livestock from Sheep Creek.

The Sheep Creek Restoration Project encompassed 3.0 miles of Chinook salmon and steelhead habitat on the LaGrande Ranger District of the Wallowa-Whitman National Forest and Bureau of Land Management. The objective is to improve spring/summer Chinook, summer steelhead, and bull trout habitat specifically through improving riparian vegetation and floodplain function and increasing pool quantity/quality, fish cover, habitat complexity, forage availability, and residual pool depth.

Actions executed in 2014 included constructing large wood structures at 27 sites (200 wood pieces within 2.5 miles of stream), removing/modifying 29 legacy log sills, planting 3 miles of riparian area, constructing 1,000 small exclosures to protect seedlings, and seeding of disturbed areas with native grass/forb seed. The placement of large wood and root wads in the channel provide fish refuge, promote pool development by hydraulic scouring, and create habitat complexity. Project partners included BPA and BLM and the total project cost was \$237,098.

For more information, please contact Joe Vacirca, Forest Fisheries Biologist, Wallowa-Whitman NF, [jvacirca@fs.fed.us](mailto:jvacirca@fs.fed.us).



# WILLAMETTE NATIONAL FOREST

## Little Fall Creek Restoration Project

The Little Fall Creek Restoration Project is located in Little Fall Creek, a tributary of Middle Fork Willamette River, east of Eugene, Oregon. Flood-control dams on the Middle Fork Willamette River have severely reduced access to historic habitat for anadromous spring Chinook salmon and steelhead. As an undammed tributary to the Middle Fork Willamette, Little Fall Creek provides the opportunity for both species to spawn and rear with minimal human intervention, but in-stream conditions have been greatly simplified by past logging, splash damming, and stream cleanout.

Pre-project analysis showed that the 3-mile Forest Service section of Little Fall Creek had the best opportunities for reincorporation of large wood where long stretches of low gradient, simplified habitat existed. Supplementing previous work done by the Middle Fork Ranger District, this project added more complexity to the system by yarding large standing trees into the channel with root wads still attached. Additional wood was later flown in by helicopter and dropped behind these “key pieces”, allowing the stream to rearrange them as would naturally occur. Using grant funding from the Oregon Watershed Enhancement Board for

Phase 2 work in 2014, more than 80 trees were tipped to serve as key pieces and over 200 logs and root wads were placed behind key pieces, creating 20 additional jams in Little Fall Creek. Just downstream, Weyerhaeuser worked with the Council to construct boulder features that mimic landslide deposits and are low risk to road infrastructure on their lands and small private landowners downstream.

The Little Fall Creek Restoration Project completes 90% of anadromous fish habitat restoration in the Forest Service portion of Little Fall Creek. It restores large wood to a free-flowing stream for ESA listed Upper Willamette spring Chinook and steelhead spawning and rearing. The project implements a well-designed collaborative effort through the Middle Fork Willamette Watershed Council in cooperation with Weyerhaeuser Company, a key landowner in the sub-watershed. The total project cost was \$172,825, with partners contributing \$95,550 of the cost.

For more information, please contact Johan Hogervorst, Forest Hydrologist, Willamette National Forest, 541-225-6430.



A complex of large wood placed by helicopter upstream of a key log in Little Fall Creek. The resulting jam will create juvenile fish cover and refuge from high flows, connects water to the floodplain, and stores nutrients that feed the food web.



## Locations of Forest units in the Pacific Northwest Region of the USDA Forest Service



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